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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/555,344	11/01/2005	Francois Costa	28944/50009	4534
57726 7590 04/23/2007 MILLER, MATTHIAS & HULL ONE NORTH FRANKLIN STREET SUITE 2350 CHICAGO, IL 60606			EXAMINER ROSENAU, DEREK JOHN	
			ART UNIT	PAPER NUMBER
			2834	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/23/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/555,344

Applicant(s)

COSTA ET AL.

Examiner

Derek J. Rosenau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4-6 and 8-12 is/are rejected.
- 7) ☒ Claim(s) 2, 3 and 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 1/6/06 1/12/06
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement filed 1/6/2006 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered. The document "Commande de Transistor a Grille Isolee par Transformateur Piezoelectrique Bras Complet" is in French, and there is no explanation of the relevance of that document.

### ***Specification***

2. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

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- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

3. The disclosure is objected to because of the following informalities: on page 6, line 4, it appears that "primary and second electronic components" should be "primary and secondary electronic components".

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 10, and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Carazo et al. (US 6617757).

6. With respect to claim 1, Carazo et al. discloses an electronic circuit (Figs 11 and 12) provided with a piezoelectric transformer (item 6) for driving an electronic component (Figs 11 and 12), in which the transformer comprises a primary plate (item 6A) and a secondary plate (item 6B) made from a piezoelectric material (column 12,

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lines 19-25), together with an insulating intermediate insulating layer (item 65) interposed between the primary and secondary plates (column 22, lines 19-35), the primary plate being arranged to transmit a displacement signal to the secondary plate through the intermediate layer in response to a primary signal that is transmitted to the primary plate via an electronic circuit (column 15, lines 46-65 and Figures 11,12), and the secondary plate delivering a secondary signal to the electronic component as a function of the primary signal for the purpose of driving the electronic component to which the secondary plate is connected (column 15, lines 46-65 and Figures 11,12), the circuit being characterized by the fact tat it comprises a first layer (item 6A) in which the primary plate is integrated and a second layer (item 6B) in which the secondary plate is integrated, the first and second layers being galvanically isolated from each other by the intermediate layer (item 65).

7. With respect to claim 10, Carazo et al. discloses an electronic circuit according to claim 1, in which the primary and secondary plates are made out of a piezoelectric material that is biased in thickness (column 6, lines 15-18 and 24-26).

8. With respect to claim 11, Carazo et al. discloses an electronic circuit according to claim 1, in which the electronic component is a MOSFET or an IGBT (column 23, lines 29-31).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carazo et al. in view of Hui et al. ("Some Electromagnetic Aspects of Coreless PCB Transformers).

11. With respect to claim 4, Carazo et al. discloses an electronic component according to claim 1, in which the electronic component is a power transistor (item Q1, Q2) and having a gate receiving the secondary signal (Fig 1).

Carazo et al. does not disclose expressly that the power transistor is integrated in the second layer.

Hui et al. teaches a piezoelectric transformer device in which the transformer and circuitry are integrated into a single layer (Fig 6a).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the integrated circuit of Hui et al. with the electronic circuit of Carazo et al. for the benefit of forming the device as a single component.

12. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carazo et al. in view of Fairless (GB 2013343).

13. With respect to claim 5, Carazo et al. discloses an electronic circuit according to claim 1.

Carazo et al. does not disclose expressly the first layer having a primary circuit comprising a modulator connected to the primary plate and adapted to from the primary signal with at least one carrier signal being modulated by a drive signal, and to deliver the primary signal as formed in this way to the primary plate; or the second layer having

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a secondary circuit comprising a demodulator connected between the secondary plate and the electronic component, and adapted to transmit to said electronic component a signal demodulated from the secondary signal corresponding to the drive signal.

Fairless teaches an electronic circuit for a piezoelectric device (Fig 1) having a modulator (item 16) connected to the primary plate and adapted to from the primary signal with at least one carrier signal being modulated by a drive signal, and to deliver the primary signal as formed in this way to the primary plate (page 2, lines 3-10); and a secondary circuit comprising a demodulator (item 18) connected between the secondary plate and the electronic component, and adapted to transmit to said electronic component a signal demodulated from the secondary signal corresponding to the drive signal (page 2, lines 11-15). While Fairless does not discuss that the modulator is adapted to form the primary signal by modulating the primary signal and a carrier signal or that the demodulator is adapted to demodulate the secondary signal and drive signal, these are simply inherent as these are simply the functions of a modulator and demodulator.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the modulator and demodulator of Fairless with the electronic circuit of Carazo et al. for the benefit of eliminating undesired frequency components (page 2, lines 52-58).

14. With respect to claim 8, the combination of Carazo et al. and Fairless discloses an electronic circuit according to claim 5. Fairless discloses an oscillator (item 15) adapted to deliver the carrier signal to the modulator. Carazo et al. discloses an

oscillator adapted to deliver a signal at a frequency that is close to a mechanical resonant frequency of the transformer (column 5, line 65 through column 6, line 4).

15. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carazo et al. in view of Fairless (GB 2013343), Kawashima (US 5654605), and McElroy (US 4317368).

16. With respect to claim 6, the combination of Carazo et al. and Fairless discloses an electronic circuit according to claim 5.

Neither Carazo et al. nor Fairless discloses expressly that the secondary circuit further comprises a rectifier device connected between the secondary plate and the demodulator, and adapted to rectify the secondary signal delivered by the secondary plate.

Kawashima teaches an electronic circuit for a piezoelectric transformer (Fig 1) including a rectifier device (item 20) connected between the secondary plate and the comparators (Fig 1), and adapted to rectify the secondary signal delivered by the secondary plate (column 3, lines 26-35).

McElroy teaches an electronic circuit at the output of a piezoelectric transducer in which a rectifier is between the output of the transducer and a demodulator, which in turn outputs a signal to comparators (Fig 6).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the rectifier of Kawashima and McElroy with the electronic circuit of Carazo et al. as modified by Fairless for the benefit of controlling the driving frequency to ensure stable operation (column 3, line 25 through column 4, line 34).



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17. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carazo et al. in view of Fairless and Fujimura et al. (US 20040222718).

18. With respect to claim 9, the combination of Carazo et al. and Fairless discloses an electronic circuit according to claim 8.

Neither Carazo et al. nor Fairless discloses that the oscillator is adapted to deliver a carrier signal at a frequency close to the frequency of the second resonant mode of vibration of the transformer.

Fujimura et al. teaches an electronic circuit for a piezoelectric transformer in which the oscillator is adapted to deliver a carrier signal at a frequency close to the frequency of the second resonant mode of vibration of the transformer (Paragraph 23).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the second resonant mode of Fujimura et al. with the electronic circuit of Carazo et al. as modified by Fairless for the benefit of allowing for multiple frequencies of operation (Paragraph 23 of Fujimura et al.).

19. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carazo et al. in view of Chou et al. (US 6943785) and Hui et al.

20. With respect to claim 12, Carazo et al. discloses an electronic circuit according to claim 1.

Carazo et al. does not disclose expressly an additional piezoelectric primary plate integrated in the first layer, and an additional secondary plate integrated in the second layer and connected to an additional electronic component, the electronic component being connected to form a complete arm of a bridge.

Chou et al. teaches an electronic circuit for a piezoelectric transformer that includes an additional piezoelectric primary plate, and an additional secondary plate and connected to an additional electronic component, the electronic component being connected to form a complete arm of a bridge (Fig 3).

Hui et al. teaches an electronic circuit for a piezoelectric transformer in which transformers and their corresponding circuitry can be integrated into a single layer, and it would be obvious to place the circuits for the primary and secondary plates in separate layers as the primary and secondary plates themselves are in separate layers.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the additional primary and secondary plates of Chou et al. and the integrated circuit of Hui et al. for the benefits of being able to deliver a secondary signal of increased power (column 2, lines 48-58 of Chou et al.) and forming the device as a single component.

***Allowable Subject Matter***

21. Claims 2, 3, and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not disclose or suggest "the primary and secondary plates being fastened in recesses previously formed in each of the layers respectively" in combination with the remaining claim elements of claim 2, or "in which the secondary circuit further comprises a locking device connected between the demodulator and the

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electronic component and adapted to deliver a reliable demodulated signal to the electronic component” in combination with the remaining claim elements of claim 7.

***Conclusion***

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Watson (US 5430342) discloses a piezoelectric transformer having a demodulator between the output of the secondary plate and an electronic component. Hattersley (US 4529904) discloses a piezoelectric device in which a modulator and demodulator are attaches to input and outputs of the device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek J. Rosenau whose telephone number is 571-272-8932. The examiner can normally be reached on Monday thru Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Derek J Rosenau  
Examiner  
Art Unit 2834

DJR  
4/12/2007

